

ABSTRACT

A Master Oscillator (MO) - Power Amplifier (PA) configuration (MOPA) can be used advantageously in an excimer laser system for micro-lithography applications, where semiconductor manufacturers demand powers of 40 W or more in order to support the throughput requirements of advanced lithography scanner systems. A MOPA-based laser system can provide both high pulse energies and high spectral purity. A MOPA system can utilize a multi-pass PA, as well as a special beam path capable of reducing the amount of ASE (Amplified Spontaneous Emission) and feedback to the MO. Lithography scanner optics are primarily fused silica, such that the peak pulse power must be kept low to avoid material compaction when a MOPA system is used with lithography applications. This conflict between the demand for high average power and the low peak power requirement of the pulsed excimer laser source can be resolved by using a novel beam path to generate a sufficiently long pulse length.